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ORIGINAL ARTICLES.

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THE DISLOCATION OF AN OPAQUE LENS.—  
NATURE'S RARE METHOD OF SUDDENLY  
AND PAINLESSLY RESTORING SIGHT  
TO A CATARACTOUS EYE.

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BY JULIAN J. CHISOLM, M.D., BALTIMORE, MD.

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In my personal experience, covering thirty years of surgical practice, at least 6,000 cataract patients have consulted me. Among these, two cases have come under my professional care, in which sight was quietly and suddenly restored to patients blind for years with senile cataract. They are of sufficient rarity and interest to have a permanent place in ophthalmic literature.

In the year 1884, I operated upon a lady, *æt.* 50, and restored perfect vision to an eye blind eight years with cataract. She was extremely frail, not weighing over eighty pounds, and was nervous to a degree. She was surrounded by every luxury, and was, notwithstanding, very miserable. She was very anxious to have sight restored, but was too timid to undergo an operation to regain it. She had been blind and helpless for four years, when, sitting alone one day in her

chamber, with eyes closed according to habit, she suddenly opened them on the approach of some one entering her room. She saw first her hands in her lap, and then could see the approaching figure. In her fright she thought it a vision, and for some time could not believe her senses. In her case the recovery was brought about by no bodily shock. The sight, so suddenly and unexpectedly regained, permitted her to enjoy once more active life. As she was a woman of large wealth she became the wonder of the city. Her miraculous restoration was for a time the absorbing topic of society discussion. The regained privilege in this case was not permanent. After a few months of happiness, darkness slowly resumed its way and she became again blind. I had examined the eyes when the cataracts were forming, and also when they had matured. She had made several appointments to have one of them operated upon, but her courage always failed her when the day for operation approached. When sight came back to her so wonderfully she was congratulated by her friends for her procrastination. Upon examination of the restored eye I found that the opaque lens had fallen into the vitreous chamber and was now out of the line of vision. In the course of a few months the optic nerve took on atrophy and all light slowly and painlessly vanished from the eye. With the other she still had good light perception. After four more years of blindness, and after much persuasion, she was finally induced to have the cataract removed from the other eye under the influence of chloroform. The result was perfect restoration to sight, with the ability of reading the finest print with ease. This sight she still enjoys.

*The second case* was in a gentleman, æt. 45. He had lost the right eye when a child from injury, stuck with a fork. When I first saw him in 1888 he had recently become dull of vision in the left eye also. He had been struck in this eye by a small twig, and the sight had been slowly deteriorating for the past twelve months. Upon examination the lost eye was found everted. The pupil was closed, and adherent to a calcareous lens. In it there was no light perception. With the

left eye he could count fingers at four feet. In this eye there was a well developed senile cataract, a free pupil, with a tremulous iris. As the eyeball moved from side to side I detected a slight motion in the lens, indicating a weakened, suspensory ligament. With the ophthalmoscopic mirror a reddish reflex from the choroid could still be seen. I saw him again in March, 1890. During the interval the opacity of the lens had been complete and only light perception in this eye remained. He came to Baltimore to make inquiry concerning the operation of extraction. It was not convenient for him to have it done at this visit, but he promised to return in the fall for operation. November, 1890, he came to the city for examination, and especially to seek an explanation for the miraculous recovery of his sight. When he went to bed on the night of the November 5, he was as blind as he had been for many previous months. When he opened his eyes on the morning of November 6, he could see all the objects in his chamber. The wonderful transition from blindness to restored sight had come on during his sleep. An ophthalmoscopic examination showed what had occurred. At the most dependant portion of the vitreous chamber the opaque lens was seen. It had tumbled away from the pupil during the night by the giving way of the suspensory ligament, and no longer interfered with vision. With a +14D lens he had  $V=\frac{15}{LXXX}$ , and by use of an +18D lens he could read the finest print with ease. He had a clear black pupil. I saw this patient again in November, 1890, one year after the miraculous recovery. He still continued in the full enjoyment of excellent vision.

## NEWS.

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### SECTION ON OPHTHALMOLOGY OF THE AMERICAN MEDICAL ASSOCIATION.

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The next annual meeting of this Section will be held in Detroit, Mich., June 7, 8, 9 and 10. The Cadillac Hotel has been selected as headquarters. For the purpose of becoming better acquainted, and cultivating a feeling of good-fellowship among the members of this Section, they will dine together Wednesday, June 8, at 6 P. M., at the Cadillac Hotel. The price of the tickets will be two dollars each, and can be obtained from any member of the Executive Committee. All those expecting to be present will kindly notify the Committee.

The Section will hold two working sessions daily. The first will open at 9 A. M. and close at 11 A. M. The second will open at 3 P. M. and close at 6 P. M.

Titles of papers for the next meeting should be sent at once to the Chairman of the Section, Dr. J. L. Thompson, of Indianapolis, Ind., or to Dr. George F. de Schweinitz, 1401 Locust Street, Philadelphia, Pa.

The Committee published the transactions of the last meeting in a handsome volume, the contents of which reflected much credit on the work done at Washington, D. C. We expect the Section will considerably increase its membership this year, and that the quality of its work will be, as it should be, of the very best.

S. C. AYRES, Cincinnati, Ohio.,

F. C. HOTZ, Chicago, Ill.,

EDWARD JACKSON, Philadelphia, Pa.,

Executive Committee, Section on Ophthalmology, A. M. A.

## SELECTIONS.

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### KERATITIS BULLOSA.<sup>1</sup>

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BY J. ELLIOTT COLBURN, M.D., CHICAGO.

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This exceedingly rare disease of the cornea I have met but twice in a private and dispensary practice extending over a period of more than ten years. Researches made for literature upon the subject yield scanty returns, as many other specialists appear to have been even less favored, and some of the articles are quite vague, and rather evince the idea that the writer has not personally come in contact with the disease

Mr. O—— had been suffering for seven months from a recurring sensation of irritation in the lower lid, as he supposed, of the right eye. At night, it was only after firm pressure and much rubbing, that he was able to keep the lids closed, and frequently was not able to sleep on account of the irritation. Upon examination I found a small vesicle on the cornea, near its margin, which, on being punctured, discharged a minute quantity of clear fluid. These invasions were always attended by flushing of the head and face, considerable general disturbance and ocular neuralgia. At this time the patient was given a solution of zinc. sulph., grains 2, aquæ ounce 1. Eight days later the vesicle had again filled, and the irritation had returned. I again opened the sac, thoroughly removing the pellicle, and made an application of a 4% solution of argentum nit.; it did not recur. I was unable to determine any disease or abnormality of the eye, or any cause for the growth.

<sup>1</sup>Read before the Chicago Pathological Society, Feb. 8, 1892.

years, in delicate general health, atheromatous arteries, secretions scant, evidence of much physical suffering. She gave the following history: Twelve years before noticed that vision in right eye was below normal, and that it gradually became less, until there was only perception of light. About one year ago the eye became painful, tender and irritable, followed by the sensation of a foreign body under the upper lid. The eye felt full and protruding, the patient was unable to sleep, restless, and feverish. This condition was quickly followed by lowered sensation of the cornea, and sometimes a gush of tears would seem to give relief, and recovery quickly follow. These attacks occurred with great frequency. This condition not being benefited by the remedies exhibited, the case was referred to me nearly a year after the first invasion, when I found the following.

Left eye normal, but slightly flushed; right eye, conjunctiva much congested, lids closing spasmodically, excessive lachrymation, tension above normal, pupil slightly dilated, lens opaque and shrunken, iris tremulous. Towards the lower margin of the cornea, and extending upwards, there appeared a small elevation—clear as the cornea, but making itself seem by a small point of light reflected from its apex. This elevation was found to be somewhat triangular in shape, with the apex near the centre of the cornea, and filled with a fluid which fluctuated by the pressure of the lids. The sac was punctured, and a small quantity of clear fluid flowed out. The tumor disappeared, and a solution of boracic acid was given, with cocaine to relieve the pain. The patient was directed to return as soon as the sac had refilled, which occurred on the fifth day. The pellicle was carefully removed, and the whole area cauterized by a careful application of carbolic acid. Eserine was also given to lower the tension, and the cocaine to relieve the pain. On the seventh day the sac had again to be removed, and the exposed surface to be cauterized, this time with argentic nitr., 20 grains to the ounce. I then tried galvanocautery, actual-cautery, etc., but without any permanent results. The left eye was becoming more irritated, and tender;



My second case occurred during the past fall. Mrs. S—, photophobia, excessive lachrymation and cloudiness of the cornea after the attack had subsided in the cornea persisting after the attack had subsided in the right eye, led me to fear that the irritation in the right eye was threatening to excite sympathetic disease in the left. I then advised enucleation, and, upon consultation, Dr. Holmes concurred with me in this matter. Dr. Patton administered the ether, and assisted by Dr. Stannard, I enucleated the eye. By repeatedly instilling cocaine prior to the operation, we were enabled to remove the eye with but slight etherization. The wound healed by first intention. The left eye, which had been very irritable and painful, became normal, and the vision improved.

#### CASES OF PEMPHIGUS CORNEÆ.

These cases so closely resemble in physical appearance the preceding, that I have given three out of eight cases which have come under my observation:

CASE 1.—C. S—, æt. 11, complained of blurring vision in right eye; no pain except at night or when he attempted to close the lids. Upon examination a small vesicle was found over the center of the cornea, about one line in diameter. In attempting to rupture it by pressure upon the lid it was extended three times its former diameter. As I saw this case before the days of cocaine, I applied a pressure bandage and directed the patient to return on the second day, when I found no trace of vesicle, and no opacity. It did not recur.

CASE 2.—Mrs. A—, æt. 31, teacher, was injured in the right eye by a paper wad. Had experienced no irritation except for ten or fifteen minutes immediately following the injury. I saw her upon the fourth day after the injury, and found a small vesicle just below the center of the cornea. There was no corneal injection, or other symptoms of irritation. I advised the use of pressure bandage at night, and upon her return on the following day, I found no trace of the previous trouble.

CASE 3.—Mr. T——, of Kansas, æt. 42, a few days before leaving home noticed a slight irritation in one eye following a ride in drifting sand; had been free from annoyance after the night following the ride until four days later, when he found he could not see well, and experienced a sensation of a foreign body in the lower lid. Upon examination I found a small vesicle near the limbus of the cornea; applied cocaine, and punctured. The following day I could find no trace of the trouble.

A careful examination of the meagre literature upon this subject, both in the text-books and reports of cases, would seem to indicate that there are two forms of vesicles—one which can be, with perfect propriety, classed as a *keratitis bullosa*—accompanied by inflammatory symptoms; the other a simple *pemphigus*, free from any manifestation of irritation other than that incident to the friction of the lids over the vesicle.

*Keratitis bullosa*, or inflammatory vesicle, occurs in eyes suffering from lowered nutrition, most frequently inter-curring with glaucoma, chronic iritis, irido-cyclitis, or chronic non-suppurative pan-ophthalmitis. The first symptoms are pericorneal flushing, photophobia, sharp pain followed, in a few hours, by the sensation of a foreign body in the eye, which is aggravated by every movement of the lids and attempts to close the eye. Accompanying these symptoms there may be supra-orbital pain, and tenderness over the frontal region, and great general disturbance. After a few hours, the tension of the globe becomes markedly increased, the pain lessens and the cornea becomes more or less insensible to the movement of the lids or to the touch. The rupture of the capsule occurs spontaneously from the pressure of the lids and the rubbing of the fingers. In the interval which now occurs between the formation of the second bulla, there is a return of sensation, slight photophobia, lower tension—even to much below normal, the margin of the bulla is outlined by a slight elevation fringed by the ragged and shrunken walls of the ruptured vesicle. When the vesicle is preparing to return promptly, before there



has been complete repair extending over the area covered by the bulla, it will be frequently observed that the center gives an opalescent reflection. This occurs before there has been sufficient time to cover the space with normal epithelium, or obliterate the ragged edges of the vesicle.

According to Schmidt Rimpler, the contents of the vesicle may at times be tinted with blood, but from my observation this takes place in very chronic cases where there has been much vascularity of the cornea in the region of the vesicle, and I am not sure that the tinting with blood is not due to the rupture of vessels in the pellicle.

Arlt says that "The walls of the vesicle do not consist, as was formerly believed, of Bowman's membrane and the epithelial layer, nor of the latter alone, but of a new layer of tissue inserted between the two, and of proliferating cells." This condition would seem to explain the apparently firm boundary of the vesicle, and the impossibility of dissecting up the cornea, by pressure and manipulation. Each new vesicle is an independent structure, for there is scarcely time in the interval, for the renewal of the epithelial layer already destroyed.

*Pemphigus Corneæ.*—A non-inflammatory vesicle of the cornea, seldom multiple, nor occurring during any eruption or neuralgic disturbance of the head or face.

This form of vesicle is more frequent than the inflammatory, and may occur at any age, and may or may not be coincident with other ocular diseases. The vesicles occur centrally more frequently than at the periphery of the cornea, and frequently fill with great rapidity. There is no pain or irritation, unless the vesicle is pressed upon by the lid, and no pericorneal flushing. The base of the vesicle is oval or round, and pressure upon it, made by traction with the finger upon the lid, will extend the vesicle in the direction of the pressure, even to the dissecting of the cornea to its border.

The capsule once ruptured, never refills, but a grayish opacity covers its base, which rapidly disappears by the replacement of the epithelial layer. There remains no opacity,

or change of curvature of the cornea. In some cases the vesicles do not rupture, but become more and more attenuated, untill they finally disappear.

The causes of the formation of these bullæ are not always clear, but in my experience they have been the results of slight, non-penetrating injuries to the cornea, resulting in a separation of the epithelial layer. A close examination of the contents have never revealed any encysted foreign particle.

The treatment of keratitis bullosa, aside from enucleation or abscision, has not met with brilliant results. Hasner reports a case of cure following a superficial excision of the portion of the cornea involved. Mittendorf suggests quinine, and anti-malarial remedies, but casually remarks that these have never cured.

Iridectomy and paracentesis corneæ have been tried without benefit. In my case we tried cautery with carbolic acid, 75%, argentum nit., 4%; galvano- and thermo-cautery, and curetting, without permanently good results.

In view of the reports of cured cases, even though the differential diagnosis may not have been carefully made, it would seem advisable to try any or all of the means of cure suggested, especially if the vision of the fellow eye is below normal, and is liable to further degeneration. If the patients are weak and debilitated from disease or age, it would seem best to state the case fairly, and allow them to determine whether they will submit to further attempts to cure with the possibility of failure, or at once submit to enucleation. The possible influence of the constantly recurring irritation of the effected eye on its fellow, must not be overlooked, and vigilant which kept for any symptom pointing to sympathetic disease. Cocaine and eserine may be used for local relief. In the treatment of simple vesicle or pempbigus corneæ I have had good results from ordinary pressure bandages, but lately have used cocaine, and punctured the sac with a fine point. I have found no other treatment required in the eight cases, three of which I append in my report.

## DISCUSSION.

Dr. J. M. Patton.—Mr. President, I had the opportunity of examining the eye, and I saw the operation in this case, and the appearance of the vesicle resembled so much that of the pemphigus from what I have seen, that it seems to me it would be very difficult for a person to make a differential diagnosis, and that we might readily get into difficulty by waiting too long trying to do something with that form before the general practitioner would recognize the fact that he had anything else but a pemphigus vesicle to deal with. The case which I saw was probably a well marked one, and the operation was skillfully and quickly done by Dr. Colburn—necessarily so, because the lady was quite old and feeble; she had organic disease of the heart muscle and valves, and it was a question as to whether she would be able to take an anæsthetic. Certainly it would not be safe to have given her chloroform, and probably not safe to have given ether to full anæsthesia. The case illustrated the fact that such operations may be nicely done by a moderate amount of anæsthesia combined with the use of cocaine locally. She took a small quantity of ether to the first stage of etherization; it did not reach the disturbing period at all. She felt no pain, and the operation was done without any trouble whatever. It could not have been done so quickly and efficiently with either of the anæsthetics alone, or by the single use of cocaine.

I would like to ask Dr. Colburn if there are any distinguishing features to differentiate these two forms that he would lay special stress on?

Dr. Colburn.—I endeavored to point out the two forms of the disease in the differential diagnosis. In the simple vesicle or pemphigus we have no inflammatory symptoms, excepting those incident to the irritation of the lid in moving over the vesicle. In keratitis bullosa we have the inflammatory symptoms preceding and following the formation of the vesicle. And then, furthermore, in keratitis bullosa the vesicle occurs almost invariably in eyes that have been previously diseased,

and in those in which there has been marked interference with the nutrition. In the case which I first mentioned, it would be almost problematical whether the condition related to keratitis bullosa or pemphigus corneæ were it not that it had persisted for so long a time; from the fact that there had been a constant irritation for a period preceding the formation of the vesicle, during its development, and after it had emptied, it would point to its being what we know as a keratitis bullosa. Then there is the period of anæsthesia that occurs for a short time after the vesicle is thoroughly filled, and very frequently in these cases, so far as I can find from the literature of the subject, there is increased tension of the eye. In pemphigus corneæ I have not seen a single case of recurrence of the disease. Another point of difference is that in simple vesicle you can by pressure through the lid extend the vesicle in any direction. In keratitis bullosa you cannot so extend it; it is perfectly rigid. The vesicle will rupture after firm pressure, but will not extend beyond its primary limits. In this case, I think that the constant attempts to remove the vesicle increased the irritable condition of the eye and tended to produce sympathetic irritation in the other eye. Whether there was any sympathetic inflammation excited in the other eye, I do not know. That could only be told by following the case for some time.

Dr. Patton.—You would lay stress on the history or absence of continued irritation in the eye, would you not?

Dr. Colburn.—Yes. If I were convinced that the patient had a recurrent vesicle, and that this was but one of many, I should call it keratitis bullosa, if the case had the other symptoms of inflammatory invasion.

Dr. Geo. H. Cleveland.—I would like to ask Dr. Colburn what connection there is between these troubles and a simple ulcer of the cornea? Or whether a simple ulcer of the cornea may result from these affections? In a simple inflammation, involving corneal layers with destruction of the layers, would perforation occur if the case continued? Furthermore, what is the exact pathology of this trouble (keratitis bullosa)? Have microscopical examinations been made in reference to a specific

organism? If so, what effect would the stronger antiseptics have in the treatment of both affections?

Dr. Colburn.—To the query, whether they would produce ulcer of the cornea, I would say this, that, I presume, if any of those vesicles were ruptured in an eye that contained any of the pus-producing microorganisms, you might get an ulcer following; but there must necessarily be some infection, and, the first form is pretty well guarded from infection, because it is evident from the investigations of Arlt that it has an epithelial lining membrane, and that would rather protect it from inoculation. In the case of pemphigus corneæ, where there are simply vesicles to break down, I presume that, if under proper conditions they were infected, an ulcer would be produced. I do not see why they should not be subject to infection as well as when a foreign body punctures the epithelial layer. The tears are so well provided with the power of destroying, washing out and keeping clean the conjunctival sac, that it seldom is infected. If the nasal duct and lachrymal sac are inhabited by organisms, I have no doubt they might extend and produce trouble.

Regarding the true pathology, I think very little definite of the first form is known. The examinations made by Arlt would seem to indicate that there is a new formation between the epithelial layer and Bowman's membrane, and that it is speedily reproduced. It will take four or five days for the new epithelium to extend over the denuded area, yet bullæ will appear within eight days from the time one has been destroyed. I do not think there is any microorganism entering into the cause of its formation.

Dr. J. J. M. Angear.—Charcot has taught us that certain ulcers follow disease of the spinal cord. Pathologists agree, I think, that herpes is the result of nerve irritation; that we have ulcers of the eye from the destruction of the optical branch of the fifth pair of nerves. I have listened to the paper attentively, and I thought if there was anything pertaining to the nervous system that was the real cause of these ulcers;

or whether pathologists have thrown out the least intimation with reference to this affection being a nerve trouble.

Dr. Colburn.—I purposely avoided the discussion of herpes, as it comes under an entirely different head. So far as I have been able to learn there is no relation between the nerve irritation and the formation of these vesicles; there may be indirectly in the simple vesicle. There you have a separation from the impinging of some foreign body on the cornea—a separation of the epithelial layer from its basement membrane, which may be due to paralysis of the terminal nerve supply. It is purely local, however, and it is simply the terminals that are so affected. Enucleation should be a last resort in cases where the constant irritation is exhausting the patient or threatening the fellow eye with sympathetic disease.

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SYPHILITIC PLASTIC IRITIS; GUMMATOUS  
(IRITIS PAPULOSA); GUMMA OF THE  
IRIS; AND SYPHILITIC SEROUS  
IRITIS.<sup>1</sup>

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BY G. E. DE SCHWEINITZ, M.D.,

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It happens that the wards of the Hospital now contain an unusual number of cases representing the various types of syphilitic disease of the eye, and illustrating in a peculiarly happy manner the varieties of syphilitic affections of the iris.

The first patient that I present to you, a man in middle life, is convalescing from a bilateral attack of plastic iritis. As I illuminate the pupillary area, you observe the irregular character of the pupil, the margins of the iris being bound down in several points to the capsule of the lens, forming posterior synechiæ. The irides are slightly discolored, but there are neither nodes nor swelling on their surfaces. The general red injection of the eyeball, and particularly the fine area of ciliary injection, the so-called circum-corneal zone, more or less characteristic of inflammation of the iris and ciliary body, has well-nigh subsided. The pain, the slight discoloration of the aqueous and the faint haze of the cornea, which at one time were present, have likewise disappeared.

Necessarily a question of paramount importance in the treatment of every case of iritis is the cause of the trouble. If an examination is made of the dispensary service of any

<sup>1</sup>A Ward Lecture at the Philadelphia Hospital.

large hospital, where great numbers of cases of general syphilis come for treatment, with reference to the question how many of them have had iritis during the course of their disease, the percentages vary, according to Alexander, from 0.42% to 5.37%. If, on the other hand, all cases of iritis which come for treatment are gathered together, and the percentage of those in whom the disease may safely be ascribed to syphilis is computed, the figures assume a very different proportion, varying according to Alexander, 28.7% to 75%. Consequently it may safely be assumed that about 50% of the cases of iritis are syphilitic in origin.

Simple plastic iritis, or that variety which I have just exhibited to you in the convalescing stage, is probably the most common form. The well known symptoms of iritis are present; namely, pain, lachrymation, dimness of vision with cloudiness in the aqueous humor, circumcorneal injection, discoloration of the iris, immobility of the pupil and the formation of posterior synechiæ; but the presence of an iritis of this character is not diagnostic of syphilis, in spite of the fact that a form of iritis quite indistinguishable in its clinical characters is frequently present in the secondary stages of syphilis. I want to impress upon you the fact that although syphilis is probably the most frequent cause of iritis, this form of iritis is not pathognomonic of syphilis. When it occurs during an attack of syphilis, it usually appears from six to eight months after the primary infection. Nearly always bilateral in the end, it is rarely simultaneously bilateral, one iris usually being inflamed before the other and more violently than its fellow. When treatment has been thorough, relapses, although they occur, are much less frequent than with the similar type of iritis which takes place under the influence of rheumatism. Like ordinary non-syphilitic plastic iritis, it may be acute, subacute, or chronic in its course, and, as has been stated, it possesses no clinical characteristics from which its cause may be positively established. According to the belief of some authors, however, there is in these cases really a

parenchymatous or condylomatous change not visible by ordinary clinical methods.

The second case which I show you is a patient in middle life presenting perfectly characteristic lesions. According to the history, we learn that the initial infection took place in the late summer of 1891, or between six and seven months before the date of the present examination. His forehead is covered with a coarse lesion, resembling those seen in the tertiary stage of this disease. They should, however, be classed with the papular syphilides, and represent the type which is sometimes called the irregular papular syphilide, not an early manifestation of syphilis, but one that may come on towards the end of the first year or the beginning of the second: The left iris presents characteristic features. You observe that the inner border of the pupil contains three circumscribed, yellowish tumors, somewhat larger than hemp-seeds, slightly reddish on their apices and crossed by a number of fine vessels. The remainder of the iris is intact, and there is an absence of the posterior synechiæ and binding down to the capsule of the lens which were marked features in the other type. There has been some pain, some pericorneal injection, and some lachrymation, but these have not been prominent symptoms.

There is a *parenchymatous* type of iritis, and the disease usually receives the name of *gummatous iritis*. In contradistinction to the plastic iritis of the preceding case, it is characteristic of syphilis, and from it alone the diagnosis may be made. Although not a common form of iritis, it occurs with considerable frequency. Thus, according to Alexander, in a collection of 414 cases of iritis by various authors, 74 of them or 17.8%, represented the type known as iritis gummosa. Among these authors, for example, Schmidt found in 47 cases of iritis, 7 of this variety; Knapp, among 26 cases, 5; and Coccius, among 42 cases, 5. In the wards of this Hospital from June 1, 1887, to December 31, 1889, among 61 cases of iritis which I observed, there were four presenting this type of iritis.

The development of this form of iritis in spite of its name,

does not belong to the late stages of syphilis, or to the stage of gummatous formations in the rest of the body. It may begin directly by the formation of the little yellowish-red nodes, either at the pupillary border or at the ciliary border, or less commonly between the tissues of the iris, or these phenomena may occur in the course of an ordinary plastic iritis, such as I have described to you. The points to remember are the characteristic appearance of the disease; the fact that it is pathognomic of syphilis; that it does not represent a late stage of the disorder; and that for this reason it might be well to adopt the name which has been given by Alexander and other authors, *iritis papulosa*, so as to contrast it with another type of syphilitic iris disease, to which I shall now call your attention, *gumma of the iris*.

The next patient which I present to you is a man about 50 years old, whose mental condition is such that it is practically impossible to obtain a satisfactory clinical history. He was brought here on the 28th of December with violent photophobia, both eyes inflamed, the conjunctivæ chemotic and the lids slightly swollen. He was cupped on each temple, and given saline purges and a free pilocarpine sweat. Atropine drops were instilled into each eye freely and ascending doses of potassium iodide were exhibited. Very shortly after his admission a curious type of delirium occurred, characterized by a fixed delusion of persecution, and afterward manifesting itself as an irregular type of delirium tremens, although many of the symptoms were closely allied to those which are produced by toxic doses of belladonna. Under treatment the violence of his ocular inflammation gradually subsided, and, although, as you see, there is still marked photophobia, I am able to demonstrate the lesions.

There is considerable haze of the cornea, and a large yellowish-white mass, not covered with vessels as in the other case of nodes upon the iris, which pushes its way toward the ciliary border and partially fills the anterior chamber. A few days there was in addition to this, a layer of pus at the bottom of the anterior chamber, forming a so-called hypopyon. The

other eye is similarly affected at the present time, the deposit having rather a whitish than a yellowish-white appearance, and also with a tendency to spread toward the ciliary region. There are no other definite scars and no other gummata in this man's body, but in spite of this fact I am inclined to look upon this as a gummatous deposit.

The presence of hypopyon associated with an iritis is very rare, and it is probably correct, as Alexander maintains, that whenever pus or blood appears in the anterior chamber, associated with syphilitic iritis, there is involvement of the ciliary body, or, in other words, an irido-cyclitis. This evidently is the case in this patient, and we are dealing here not simply with a lesion of the iris manifesting itself in a growth in the iris tissue which is probably gummatous, but also with extensive disease of the ciliary body, and, no doubt, if we were able to examine the interior of the eye, with lesions in the whole uveal tract.

The gumma of the iris belongs, as its name implies, to the late stages of syphilis, or, in other words, to the stage when gummatous deposits appear in other portions of the body. It presents the characteristics of a new growth, containing tissue that is but scantily supplied with blood-vessels, and with a tendency to undergo cheesy degeneration, leaving as a result of its presence, and after its absorption, a scar in the iris tissue to mark its original seat. Gummatous iritis, or, to use Alexander's term, iritis papulosa, on the other hand, presents one or more reddish-yellow nodules richly covered with blood-vessels, which readily absorb without the production of scars, the rest of the iris tissue being often practically intact. Even if we classify the present case as one of gumma of the iris, it should be remembered that we deal with an extensive disease of the ciliary body also, and probably with a gummatous irido-cyclitis so that the distinguishing features which I have just detailed are not typically manifest.

The last case which I show to you represents another type of iritis which occasionally occurs under the influence of syphilis, and which has been variously called *serous iritis*, *Descemi-*

*titis or keratitis punctata*, receiving the last name because of an exudation in the form of dots, usually triangular in shape, upon the posterior layer of the cornea. It is an uncommon form in syphilis, and is generally preceded by some form of plastic iritis. Serous iritis occurs frequently under other circumstances. It is not rare with menstrual disturbances and in puerperal cases; it is one of the manifestations of sympathetic ophthalmitis, and may be brought into existence in the course of a variety of diseases. Syphilis is only one of its causes, and the occurrence of serous iritis must not be ascribed to syphilis until a number of other conditions, some of which I have mentioned, are eliminated. It is nearly always accompanied by changes in the deeper structures of the eye; vitreous opacities, choroiditis, alteration in the composition of the aqueous humor, and probably a catarrhal inflammation of the glands of the ciliary body, as has recently been shown by some beautiful investigations by Collins, in England. Hence, serous iritis is more accurately described as serous cyclitis, a name suggested some time ago by Priestley Smith. In contradistinction to plastic iritis, this disease is less likely to be accompanied by synechia. The anterior chamber may be deep in the beginning of the disease, but later on becomes shallow; the pupil is sluggish, sometimes semi-dilated, and the iris not necessarily attached to the capsule of the lens; the aqueous humor is often discolored; and the triangular collection of dots which you here see upon the posterior layer of the cornea, looking very much like minute drops of dirty water upon a clouded pane of glass, is characteristic. Sometimes the tension rises and the symptoms of glaucoma set in. You observe that this patient has other syphilitic lesions, namely papular syphilides belonging to a moderately late period, probably the beginning of the second year. As I have already stated to you, this form of iritis has developed after a plastic iritis with which he was affected some time ago.

In all the cases of iritis which I have shown you to-day the ordinary syphilitic treatment is efficacious. You may, in the earlier stages, give the protiodide of mercury in rapidly in-



creasing doses, until there is slight tenderness of the gums. This may be discontinued then, and potassium iodide may be substituted; or, as many of the patients come when it is desirable to get a very pronounced mercurial impression at once, it is our custom to give them mercurial inunctions, followed later by potassium iodide. In a few instances hypodermics of mercury have been used. My own experience is very much against this form of medication. It seems very well established at the present day that mercury is the proper remedy for syphilis at all stages, although you know it was once taught that in the later or gummatous period, especially if there was much cachexia, this was not a suitable remedy. It is a curious fact, however, that in true gumma of the iris, at least if I may be permitted to base an opinion upon two experiences, the resorption of the new growth was much more rapid under the influence of potassium iodide in massive doses than under influence of mercury. This accords with the statement of Alexander. I certainly would not advise you to use potassium iodide to the exclusion of mercury; but I would be inclined, in a gummatous deposit in the iris, to place a great deal of reliance upon it. Remember, when I say a gummatous deposit I do not refer to gummatous iritis, but to the disease which I have described as true gumma of the iris.

Locally, atropine is indicated in all cases save in serous iritis when there is a tendency to increase of intraocular tension and the fear that glaucoma develop. If pain is severe, leeching from the temple, hot applications and, if necessary, morphia, antipyrine or phenacetine, may be employed at night. Leeching not only allays the pain, but by relieving congestion of the iris, permits the absorption of the atropine and enhances its influence on the iris and peripheral ends of the oculo-motor nerve.

In conclusion, and in *resumé*, let me say that about 50% of the cases of iritis are syphilitic; and that in secondary syphilis we very often have a form of iritis quite indistinguishable from the ordinary plastic form of the disease, and presenting, so far as ordinary clinical methods are concerned, no features

which are diagnostic of the disease which may occasion it. We have another type of iritis characterized by the formation of one or more reddish-yellow nodes or papules, situated at the ciliary border, at the pupillary border, or sometimes between the two, while the rest of the iris remains intact, which absorb under anti-syphilitic treatment without leaving scars behind them, and which in spite of their resemblance to gummatous deposits, do not belong to the late or gummatous stage of syphilis, but represent a parenchymatous type of iritis and the true form of syphilitic iritis. There is also a form of iris disease characterized by the development of a single deposit partaking of the nature of a new growth, which is a true gumma, undergoing the degenerations more or less characteristic of gumma, and belonging with other gummata to the late stage of syphilis. Finally, we may have during syphilis, either independently of, or in the wake of, a syphilitic plastic iritis, an ordinary serous iritis, or, as it is often called, keratitis punctata. In this arrangements I have followed the classification given by the author whom I have several times quoted, and, as you see, have been able to demonstrate here in the wards the various types of the disease which show the accuracy of the classification.—*University Med. Mag.*

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## A NEW INSTRUMENT FOR QUICKLY DETER- MINING REFRACTIVE ERRORS OF THE EYE.

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The refraction of an optically perfect eye is such that parallel rays of light entering it are brought to a focus on its retina. Any deviation from this condition constitutes an error of refraction, and requires for its correction some variation of the luminous rays from parallelism.

The generally adopted method of determining the refraction of the eye is to use test types placed at such a distance that the rays of light emanating from them may be regarded in practice as parallel; and the deviation from parallelism necessary to correct a refractive error is effected by placing a lens in front of the eye. Besides this procedure there are many other methods of changing the course of luminous rays coming from a test object. The single convex lens is the simplest means of varying the direction of luminous rays, and has for this reason been often used in optometry.

If an object is placed at the focus of a convex lens, the rays of light coming from this object will, after passing through the lens, be parallel. The farther the object is removed from the lens, the more the rays will converge after passing through it, and in this way the deviation necessary to correct an hypermetropia may be obtained. On the other hand, if the object is brought from the focus nearer to the lens, the rays which

leave the lens will be divergent; and this change is such as to adapt it to the refractive condition of a myopic eye.

Coccius, von Graefe, Badal, and others have made use of this principle in constructing optometers, the test objects of which consist of threads or lines, or of letters and figures placed at the focus of a lens of three or four inches focus.

All these optometers have that disadvantage that they provoke a certain effort of accommodation, inasmuch as the observer is conscious of the proximity of the test object. It is important that the accommodation be excluded in determining the static refraction of the eye; otherwise, the dynamic being added to the static refraction, the real error may be masked.

Then, too, some of these instruments do not serve to determine the visual acuteness because of the change in the size of the retinal image which they produce; the measure of visual acuteness is given by the size of the retinal image, and the acuteness of vision in one eye is comparable with that in another only when we know the size of the smallest retinal image that each can distinguish.

An optometer is fitted for the simultaneous determination of visual acuteness and refraction only on condition that the retinal images of all eyes examined by it have the same size.

The instrument here described fulfills these conditions completely, and has none of the disadvantages of the single convex lens.

The Instrument consists of a cylindrical tube about 15 ctm. long, mounted on a stand, which admits of its being regulated for height and inclination. Within the tube a 16 D. convex lens (P, Fig. 1) is fixed, at a point  $6\frac{1}{4}$  ctm. from the proximal end; that it, at just the focal length of the lens. Beyond the convex lens, and moved by means of a rack and pinion, is a concave 15 D. lens (M, Fig. 1). The effect of this concave lens is to render parallel rays divergent, but this effect is neutralized by the convex glass when the two lenses are in contact. When, however, the two lenses are separated from each other, the convex glass more than neutralizes the divergence caused by the concave glass and the rays are made to

converge. The action of the system will be better understood by reference to Fig. 1.

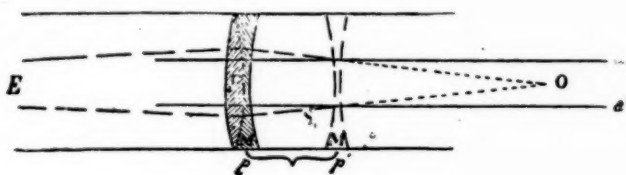


FIG. 1.—When M and P are in contact, rays  $a a'$  continue in their original direction. The effect of moving M from  $p p'$  is shown by the broken line.

The eye whose refraction is to be tested is situated at the end of the tube at E. The effect of the concave lens M upon the parallel rays  $a a'$  is to cause them to diverge, so that they leave the glass in a direction as if they came from the point  $o$ , which is the focus of the lens M, which in this case is  $6\frac{1}{4}$  ctm. in front of the glass. The effect of the convex glass P, then, upon the rays  $a a'$  is the same as if the rays proceeded directly from the point  $o$ ; in fact, the point  $o$  may be considered, in this respect, as the object. Now, as already stated, when an object is placed at the focus of a convex lens, rays of light coming from this object will, after passing through the lens, be parallel; and if the object be removed from the lens the rays will converge after passing through it. So that, if the lens M be brought into contact with lens P so that  $o$  falls in the focus of lens P, the rays  $a a'$  will leave P parallel; and if the lens M be moved away from P so that  $o$  falls outside the focus of P, the rays  $a a'$  leave P convergent, and the amount of the convergence depends upon the distance of  $o$  from P—that is, upon the distance the lenses M and P are separated. Calculation shows that for every  $\frac{100}{256}$  ctm. the lenses are separated, the effect is the same as a one-diopter convex lens, or  $+1$  D.; or a separation of the glasses 6.25 ctm. is identical with a  $+16$  D.

lens.<sup>1</sup> It will be seen, then, that every possible degree from zero or nothing up to + 16 D. can be obtained with this combination. For any concave or minus combination it is only necessary to place in the proximal end of the tube at E a minus lens of such power as to neutralize the converging rays coming from the lens P when M and P are  $6\frac{1}{4}$  ctm. apart. That is, when the lenses stand in this position, their effect is just neutralized by a concave 16 D. lens placed in the end E of the instrument, and the rays of light then leave this lens parallel again and the combination once more stands at zero. If now the lenses M and P are brought nearer together, the result is a combination *weaker* than + 16 D., so that the concave lens at E more than neutralizes this effect, and the rays leave the instrument *divergent*, or as they would after passing through a single concave lens; so that by this means every possible degree from 0 up to - 16 D. can be obtained.

In practice the tube of the instrument is graduated with a scale showing dioptries and half-dioptries, and the frame of the movable lens M carries a pointer which indicates the number of

<sup>1</sup>The formula for determining the effect of a given separation of the lenses in this instrument becomes the same as the formula for determining the point at which the image made by a convex lens falls when the distance of the object from the lens is given. For the focus of the *concave* lens is virtually the object, and its distance from the *convex* lens manifestly depends upon the distance the lenses are apart.

Let  $f$  denote the focal length of the convex lens P;  $d$ , the distance of the object (focus of concave lens) from P; and  $x$  the focal length of the resulting combination.

Then the equation  $\frac{d-f}{f} = \frac{f}{x-f}$  will give the value of any given movement of the concave lens M.

Suppose the lens M be moved away from P 0.25 ctm.; then the distance of object is 0.25 ctm. (focus of M); or  $d=6.50$  ctm. Focus of P = 6.25 ctm., or  $f=6.25$  ctm.

Substituting these values in the equation, we have

$$\frac{6.50-6.25}{6.25} = \frac{6.25}{x-6.25}, \text{ whence } x=162.50.$$

That is, the focus of such a combination falls 162.50 ctm. behind the lens P. But the lens P is placed 6.25 ctm. in front of the eyehole of the tube, hence the focus falls  $162.50 \text{ ctm.} - 6.25 \text{ ctm.} = 156.25 \text{ ctm.}$  behind the eye. A glass of 156.25 ctm. focus is  $\frac{64}{100}$  of a diopter, or 0.64 D. Therefore, separating P and M 0.25 ctm. equals + 0.64 D. From this it is easily calculated that the effect of moving M  $6\frac{3}{4}$  ctm. away from P is equal to a + 16 D lens.



dioptries corresponding to the amount of separation of the glasses. A disc having a stenopæic slit and fitting into the end of the tube serves to determine the refraction of each meridian of the eye separately.

The advantages of this combination are decided, as it allows of the use of the ordinary test type placed at the usual distance, so that no effort of accommodation is caused by the proximity of the test object. Then, by this arrangement, the anterior focus of the eye is kept at the focus of the convex lens of the instrument, so that no enlargement of the test object is produced. In other words, the conditions are most favorable for determining the actual refraction of the eye.

## SPONTANEOUS CURE OF DETACHED RETINA.

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Marchetti (*Rif. Med.*, January 16, 1892) reports the following case: A man, æt. 55, observed during November, 1890, that the vision of his left eye was becoming dim. This dimness increased very rapidly, and in four days there was left only perception of light. Examination revealed extensive detachment of the temporal and frontal portions of the retina, and of a great part of the nasal portion. The detachment fluctuated in the lower portion with the ocular movements; in the other parts it was distended in folds. Tension was reduced, vitreous transparent, and disc normal. Vision was restricted to P. L., and perception of movements of the fingers in the temporal section of the field of vision only. Vision had been previously good, but each cornea had a central leucoma, the remains of inflammation many years previously. He was treated with pilocarpine injections and iodide of potassium, and advised rest in the horizontal posture. In February, 1891, having continued the treatment till then, the eye was in the same condition, when quite suddenly, on the 16th, he regained his sight. This followed, apparently, on a sudden rotation of his head towards the right side, the patient feeling immediately, as it were, a blow on his useless eye. Directly after this he found that he could see objects distinctly and without any difficulty, and eight days after he could read small type quite easily. In June, when he again presented himself for ophthalmoscopic examination, there was a light grey streak corresponding to the detachment, but no displacement whatever remained. The field of vision was nearly normal, save for colors, and the acuity nearly as good as before, having regard to the existence of the old leucomata. The author is inclined to attribute the sudden cure to a rupture of the detached portion, with escape of the subjacent fluid.—*Brit. Med. Jour.*

## OBITUARY.

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SIR WILLIAM BOWMAN, BART., LL.D., F.R.S.

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BY SWAN M. BURNETT, M.D., WASHINGTON, D. C.

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The last of the great trio who assisted at the birth of modern ophthalmology is gone. The youngest, Albrecht v. Graefe, went first, more than twenty years ago, and the oldest, Sir William Bowman, closed his earthly career through an attack of pneumonia on March 29, of this year; and almost his last literary work was a tribute to the memory of the other—Donders—whose death is yet fresh in the minds of all.

There were strong men before Agamemnon and there have been strong men since, but there is only one Agamemnon who has served as a type of power and a tower of strength. In science, in art, in literature there have always been men who reared as peaks above the level plains of mediocrity, some higher, it may be, than others, but each distinct and with a character of his own and in no sense a rival of the others.

In ophthalmology Bowman was such a man. His position was unique, and came from a combination of circumstances and personal qualities which will never be repeated. He wrote less than either Donders or von Graefe and yet the impress he left upon the scientific world and the generation in which he lived is, without question, greater than that of either of the other two, and this largely through his character as a man. Those who have been brought for any length of time in contact with Sir Wm. Bowman will understand why he stands as a model upon which younger men should seek to mould their

professional lives. While conservative in the best sense, he was always receptive of new truths and facts, and ready and eager to adopt whatever was offered, with fair promise of gain, from any source. He had that rare possession—an open yet judicial mind. A nature calm and serene, and a temperament so justly balanced that it seemed almost impossible to disturb its equanimity enabled him to spend a long life in arduous labor as a teacher, investigator and practitioner in the metropolis of the world, in defiance of a physical organization which was the reverse of robust. Many men much stronger physically would have succumbed to the enormous draughts made upon him during the years of his active career when he did the largest private practice of any one in London.

Many of those who knew him only as an ophthalmologist are not aware that before he attained to eminence as an ophthalmic surgeon he had done work in anatomy, histology and physiology and general surgery which was sufficient in itself to place him high in medical science. He was the first to popularize histological study and investigation among medical students in London, and his work on the minute anatomy of the kidney is the basis of our knowledge on this subject to this day.

In collaboration with Dr. Todd he wrote a physiology which was the best of its time and in 1849 he published his most elaborate single work in ophthalmology—on the anatomy of the eye—which can be read with profit by the student of to-day. But it is as a teacher and an ophthalmic surgeon that his fame will be most enduring. In the zenith of his career as an ophthalmic surgeon he was *facile princeps*. By education, training and temperament he was in every way qualified to stand at the head of operators on the eye. He had a knowledge of the minute anatomy of the eye unsurpassed by any one of his time, and an acquaintance with its physiology second to none, while his manual dexterity as an operator gained from his long and ample experience as a general surgeon was absolutely perfect. To see Bowman operate was an esthetic pleasure.

He was the son of John Eddowes Bowman, a distinguished naturalist, and was born at Nantwich, July 20, 1816. He was educated at a school in Birmingham and it was, as he told me, an accident that happened to him at that time which determined his future career. An injury to his hand called in the services of Mr. Hodgson, a surgeon to the Birmingham General Hospital and the school boy was so charmed with the manner in which it was treated and so interested in watching the treatment that he resolved then to be a surgeon, and as soon as it was possible he entered the hospital as an apprentice. He began then that systematic method of studying and recording cases which went far to make him what he afterward became. It has been my privilege to see these early records full of accurate drawings to accompany the detailed history of cases which he made at that time, and they are models in case-taking. He left Birmingham to enter Kings College in London in 1837, and in 1839 was made a member of the R. C. S., and was, the same year, appointed demonstrator of anatomy as well as curator of the museum at the College. He was made a F. R. S. in 1841. In 1848 he was appointed Professor of Physiology in Kings College. He received his appointment as Assistant Surgeon to the Hospital in 1840, but was not made full surgeon until 1856.

But it was at the Royal London Ophthalmic Hospital at Moorfield that his great work in ophthalmology was done. Bowman was actually forced into an exclusive ophthalmic practice, and much against his inclination. His fame as a skilful operator and a careful diagnostician became so widespread that the profession in London, without any solicitation from him, threw the whole of their ophthalmic work into his hands, and he was so overwhelmed with it that he had no time for any thing else.

The "Reports" of the Moorfield Hospital contain most of his written contributions to ophthalmology, but his greatest work was done at that little desk in the large consultation room of the Hospital around which have gathered hundreds of eager students from all parts of the world to listen to the words of

wisdom that fell from his lips. But it was more than the clear demonstration of the clinical features of the cases or the lucid exposition of diagnosis that these students learned at that desk. They carried away with them to their distant homes an untangible something which made itself felt in all their subsequent professional lives, and affected in a greater or less degree, according to their temperament, their future aspirations and ambitions. They had lived during that time in the atmosphere of a truly noble character whose modesty, unostentation and simplicity were equaled only by the force of the intellect which held all its resources under perfect control. The work of such a life can not be computed in figures or recorded in statistics.

A few years ago his Queen conferred a baronetcy upon him in recognition of his eminent services to science and humanity. His later years have been spent in comparative retirement at his beautiful country place among the Surry Hills and amidst the gardens of flowers he tended with such affectionate care; but to the last his interest in all the scientific matters in the study of which his life had been spent was unabated.

Thus has ended, in its 76th year, a life which was as successful, from the highest point of view, as can fall to the lot of human beings.